



AVK Purchase Specification for Steel Castings

Foreword

In publishing this supplement, "Purchase Specification - Steel Castings", we have tried to gather all the conditions applying to the supply of steel castings and components to the AVK Group. Our intention with this manual is to create a better communication, improving day-to-day working conditions for everybody.

Because of its clear definitions, this supplement will provide the individual AVK Departments with a simple and exact description for notification to the suppliers regarding faults and defects and required modifications which have been found through receiving inspection of the shipments.

AVK is an international organization with suppliers all over the world. Language often presents a problem - what is the English word for this and that. This supplement will eliminate the language barrier. In the supplement we have included all frequent errors and illustrated them by means of a series of photos. Each photo has a reference number which is to be used when communicating with the purchase department on quality issues.

Further, this supplement contains already known technical terms, handling and packing instructions etc.

We hope this supplement will be a good tool to everyone and we would like to know your opinion as a user. Also if you would recommend any amendments in some fields.

Quality has to be worked every day and we hope this supplement will be a tool for this. Therefore, the objective for all of us must be to ensure "the right quality at the right time".

Scope and application

The aim of this specification is to provide suppliers to the AVK Group with details of AVK requirements for steel castings. This specification covers all AVK companies, collectively referred to as AVK. The requirements in this specification shall be supplementary to the requirements specified on AVK drawings and in relevant documentation. AVK will apply these specifications as a basis for their inspection processes during receiving inspection and production. All steel castings are required to comply with this specification.

Information contained in this specification may be superseded by information on the purchase order.

In case of ambiguity or dubiety about the meaning or effect of this specification questions should be referred to AVK.

Any requirement specified on the purchase order shall take precedence over this specification.



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1. Requirements

1.1 Steel Castings

All steel castings supplied must meet the requirements in this Specification and must be in accordance with the relevant specifications stated on the order, drawing etc.

All steel castings supplied shall be free from contamination and impurities, surface imperfections and defects, porosities and other defects unless within agreed tolerance limits as specified herein.

Edges and corners should not be sharper than a radius of 2 mm unless it is specified on the drawings.

The steel casting material and specification shall be as stated on the drawing (minimum specification). Alternative materials may only be used upon written permission from AVK or when specified on purchase order.

The steel castings shall conform to the dimensions and tolerances stated on the drawing. If tolerances are not stated on the drawing, they shall be to EN ISO 8062-3, Table 2, DCTG 11.

All steel castings shall be marked with date code, foundry identification mark and casting number (where applicable) to ensure traceability. The position of date code and casting number shall be agreed between AVK and the supplier, unless stated on the relevant drawing.

All steel castings shall be free from adhering or burnt-on sand and scale. They shall be well dressed and fettled and shot blasted to SIS 05 59 00, SA 2½ quality prior to coating.

No pitting, burnt-on sand, voids, porosity, indentations, weld splatter or other defects are acceptable. Surface profile shall be such as to enable a peak-to-valley height of between 50 µm and 100 µm after shot blasting. This is equivalent to a minimum standard of SIS 05 59 00, SA 2½ quality.

Where part lines exist that contain a step or flash, they shall be fettled until they are smooth and blended in. The general profile of castings should be as smoothly contoured as other design considerations will allow. The maximum allowable mismatch, wall thickness variation and disposition of tolerances will be in accordance with EN ISO 8062-3.

Failure to meet the above requirements shall be cause for rejection of the casting.

1.2. Coating

When specified on purchase order, the steel castings must be completely covered with one even coat of zinc phosphate primer, minimum 65 µm, applied either by brush, spray or dipping. The primer should be allowed to dry for one hour before further handling.



1.3. Materials

Materials are specified on the part drawings.

1.4. Purpose

Castings produced for AVK are generally pressure-containing parts and shall be free of contamination and impurities, surface imperfections, porosity or other defects.

Castings supplied may be subjected to a pneumatic or hydraulic pressure test at AVK works, after assembly. Failure to meet specified requirements will result in components being rejected.

2. Surface

To ensure compliance with international standard and AVK customers' requirements in respect to corrosion protection, fitness for purpose and performance and to ensure high-quality end-product surface finish the following requirements must be met:

- Internal and external surfaces shall have a surface finish as follows:
Ra = Max. 50 µm and Max. 100 µm for hand moulding;
- Thin and/or sharp flashes and burrs must be ground off;
- Cavities or flashes from core joints are unacceptable;
- All surfaces shall be free from adhering sand and other impurities;
- Feeder in-gates on machined surfaces shall not be higher than 3 mm.



3. Casting defects

3.1. Part line deviations / mismatch

3.1.1. Mould mismatch

Shall not exceed the relevant tolerance given in EN ISO 8062-3, Table 2, DCTG 5. Grinding off mismatch must produce an even and smooth joint.

3.1.2. Core deviation

Shall not exceed the relevant tolerance given in EN ISO 8062-3, Table 2, DCTG 4, except for sealing faces, where the accepted deviation shall not exceed + or - 0.3 mm. Smoothing / levelling of core deviations on sealing faces must be done with great care.

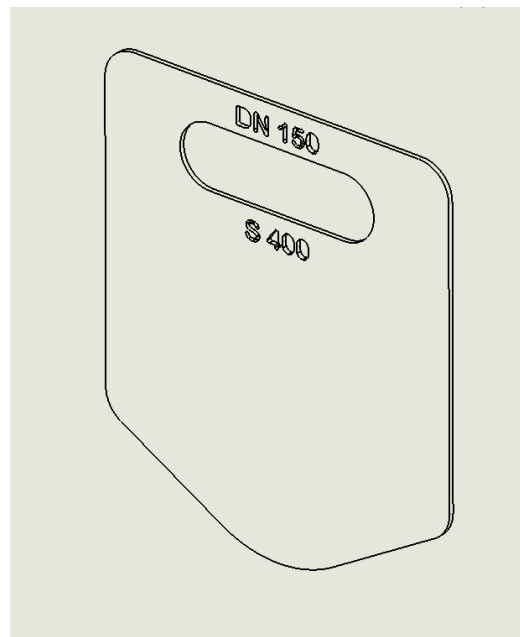
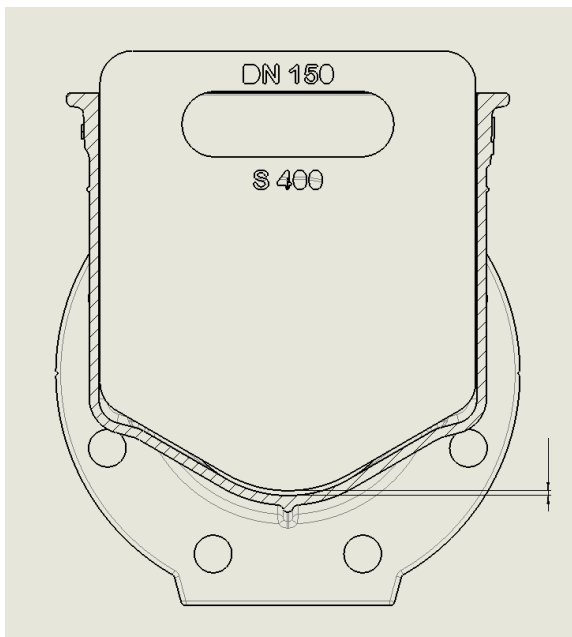
3.1.3. Dimensional control of Wedge seat areas of 46 Series bodies.

100% of castings of 46 series need to be verified with Radius gauge and A+B dimension gauge.

Distance between wedge seat and radius gauge:

0-1mm - normal delivery

1-1,2mm – delivery which need to be communicated to AVK and potentially release with AVK Q department concession.





3.2. NDT testing to identify casting defects

In general, the requirements for cast steel parts EN 1559-1, EN 1559-2, EN 10213 and prEN 16668 apply.

The non-destructive testing personnel shall be qualified and certified in accordance with EN ISO 9712 except for visual inspection where only qualified and not certified personnel is required (prEN 16668, 5.3.4).

Testing procedures according to prEN 16668 E.2.2.

Visual testing (VT) shall be done on 100% of the castings, both prototype and series and both on weld ends and shells.

3.2.1 Weld ends

Optional: By agreement with AVK, NDT can be performed on the weld ends after the machining is completed.

Material Group ¹⁾	Classification based on PS x DN	Quality level ²⁾	Surface testing, magnetic particle testing (MT) [%]		Volumetric testing (RT) [%]	
		Weld ends ⁵⁾	Prototype	Series	Prototype	Series
A	≤ 20000	1	100	5% ³⁾ of the castings of each batch on areas identified as critical on prototype ⁴⁾ . If no areas identified the whole weld end is tested	100	5% ³⁾ of the castings of each batch on areas identified as critical on prototype ⁴⁾ . If no areas identified the whole weld end is tested

- 1) GP240GH according to EN 10213 is included in material group A prEN 16668 table F.3
- 2) According to prEN 16668 table E.3. Also see “Quality levels” section below.
- 3) “Random” stated in prEN 16668 Table E.1 and E.2 is translated into 5% from ASME B31.3
- 4) See enclosure for identified areas
- 5) Weld end area: From the machined edge and 15 mm into the casting. See sketch below

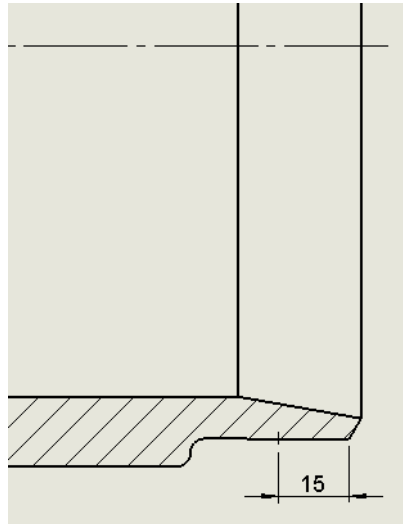


Figure 1. Sketch of weld end area

3.2.2. Shell

Material Group ¹⁾	Classification based on PS x DN	Quality level ²⁾	Surface testing, magnetic particle testing (MT) [%]		Volumetric testing (RT) [%]	
		Shell	Prototype	Series	Prototype	Series
A	≤ 3500	4	100 % of all exterior and accessible interior surfaces	Not imposed	100 % of all exterior and accessible interior surfaces	Not imposed
	> 3500 up to ≤ 20000			5% ⁽³⁾ of the castings of each batch on areas identified as critical on prototype ⁽⁴⁾ . If no areas identified the whole shell is tested		5% ⁽³⁾ of the castings of each batch on areas identified as critical on prototype ⁽⁴⁾ . If no areas identified the whole shell is tested

- 1) GP240GH according to EN 10213 is included in material group A prEN 16668 table F.3
- 2) According to prEN 16668 table E.3. Also see “Quality levels” section below.
- 3) “Random” stated in prEN 16668 Table E.1 and E.2 is translated into 5% from ASME B31.3
- 4) See enclosure for identified areas.



3.2.3. Quality levels

Quality level	Reference radiographic wall thicknesses	Permissible indicating characteristics		
		MT ^(b,c)	RT ^(b,d)	VT ^(b,e)
1 ^(a)	≤ 51 mm	SM1	A1, B1, CA1, CB1, CC1, CD1	See visual testing requirements below
4	all	SM3, LM3, AM3	A4, B4, CA4, CB4, CC4, CD4	

- a) Surface testing: Linear indications or displays arranged in series are not permitted
- b) The testing techniques shall be as specified in EN ISO 17635:2010
- c) MT characteristics according to EN 1369
- d) RT characteristics according to ASTM E 446
- e) VT according to EN 1370 Table 3

If subsurface material defects including cavities and porosities are found in castings after machining or in pressure testing to an extent affecting density and/or strength, the castings will be rejected. In such circumstances AVK reserve the right to reject all castings from the same foundry production batch.

3.3. Visually testing - defects on non-sealing shell faces

Defects within limits listed below will normally be acceptable, subject to agreement by AVK. Defective areas shall be ground smooth and be free from sharp edges.

Note that this requirement is an AVK requirement and not according to EN 1370.

Casting defect position on the casted part	Pressure-carrying walls ⁽¹⁾	Non pressure-carrying walls
Max. cavity depth [mm]	0.75	1.00
Max. rise height [mm]	0.75	
Max. size [mm ²]	100	
Max. number of defects per 2500 mm ² (50 mm x 50 mm). See fig. 3.1.1	5	
Minimum spacing between defects [mm]	5	

- 1) Minimum wall thickness on the drawings must not be reduced.

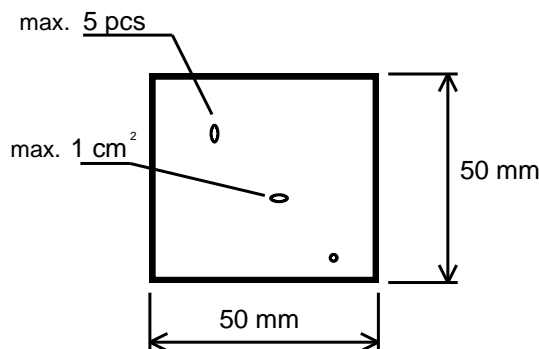


Figure 2



Removal of defects shall be done by grinding. Defective areas shall be grinded smooth and be free from sharp edges.

3.4. Visually testing - defects on edges

3.4.1. For edges not connecting with sealing faces

Defects within limits listed below will normally be accepted subject to agreement by AVK.

Casting defect position on the casted part	Edges
Max defect according to EN 1370 table 3	VD5
AVK required max. defect length [mm]	20

3.4.2. For edges connecting with sealing faces

Defects within limits listed below will normally be accepted subject to agreement by AVK.

Casting defect position on the casted part	Edges
Max defect according to EN 1370 table 3	VD2
AVK required max. defect length [mm]	15

3.4.3. Repair of casting defects on edges

Repair of casting defects on edges by grinding will normally be accepted, subject to agreement by AVK, if perfect surface is obtained. Grinding area shall not exceed above dimensions without prior agreement by AVK.

3.5. Visually testing - defects on sealing faces

For sealing face defects within limits listed below will normally be accepted subject to agreement by AVK.

Note that this requirement is an AVK requirement and not according to EN 1370.

Casting defect position on the casted part	Sealing face ⁽¹⁾
Max. cavity depth [mm]	0.2
Max. rise height [mm]	0.2
Max. size [mm ²]	100
Max. number of defects per 2500 mm ² (50 mm x 50 mm). See figure 2	5
Minimum spacing between defects [mm]	10

(1) Minimum wall thickness on the drawings must not be reduced.



Repair of casting defects by grinding will be accepted provided perfect castings are obtained. Defective areas must be smooth and free from sharp edges.

Where recesses are cast for mounting a seat ring or other components, without further machining, the surface finish shall be uniform and free from protrusions or other defects that could interfere with good sealing or location. This shall also apply to "O" ring grooves cast in bonnets, etc. No steps at any core box "part line" can be accepted.

3.6. Visually testing - defects on faces to be machined

Cavities of any form, which will be removed during machining, are acceptable.

Solid protrusions or peaks of any kind within machining allowance as specified under section 4 are acceptable.

3.7. Finishing welding on castings (repair of casting defects) found by RT, MT or VT

Repair of greater than allowed casting defects found by either RT, MT or VT by finishing welding is accepted under the following conditions:

The manufacturer shall inform AVK that finishing welding has been undertaken (EN 1559-1, 6.2.2.2 b). A sketch showing the position of the weld(s) shall be made.

If the defect depth does not exceed 40 %⁽¹⁾ of the wall thickness (e.g. 2 mm deep defect of 5 mm wall thickness) undocumented finishing welding is permissible (prEN 16668, 5.3.1.5).

A welding procedure specification (WPS) is required according to EN ISO 11970 (EN 10213, 6.2.1).

Welders shall be qualified in accordance with the procedures described in EN ISO 9606-1 (EN ISO 11970, 5)

Prior to the welding the rectified area it shall be tested from freedom from inadmissible imperfections.

Finishing welding shall be performed in accordance with a written procedure specifying the requirements for defect removal, welding, heat treatment and non-destructive testing and traceable documented (prEN 16668, 5.3.1.5). The procedure can be written by the casting supplier. The procedure shall be agreed with AVK.

Welding conditions shall be according to EN 10213, 6.2.2.

(1) If the area shall be machined the 40% is referring to the machined wall thickness.



3.8. Testing of finishing welding

The non-destructive testing shall be performed under the responsibility of a certified operator in accordance with EN ISO 9712 (EN 1559-2, 7.3.3.1 c).

The requirements of the finishing welds are equal to the requirements of the parent metal (EN 1559-2, 7.3.3.1 bd).

Testing requirement can be found in EN 13445-5, 6.5.3 first section).

EN 13445-5, Table 6.6.2-1 weld type 24 states 100% MT and RT of the repaired area.

For quality level 4 only MT is required (prEN 16668 E.2.1, 5).

For wall openings, MT shall be carried out on both sides of the finishing welding. RT shall be performed in addition (prEN 16668 E.2.1, 5) for all quality levels.

If the steel is a group 1.1 steel type (see prEN 16668 Table F.2) testing before or after any post weld heat treatment (PWHT) is permissible (EN 13445-5, 6.6.5).

Weld repairs on steel castings shall be leak-tight under hydrostatic pressure of at least 1.5 x the maximum working pressure (1.5xPS, EN 12266-1) of the equipment.

3.9. Pressure testing of the shell

Shell castings shall be leak-tight under hydrostatic pressure of at least 1.5 x the maximum working pressure (1.5 x PS, EN 12266-1) of the equipment and clause 5.2.3.

3.10. Retests

If one or more tests have given unsatisfactory or non-conforming results the retests of the castings shall be done in accordance with the procedures described in EN 1559-1 8.7.2.

Expanding the examination

If one or both samples after retesting give unsatisfactory or non-conforming results the procedure above shall be repeated where 20% of the batch is tested.

If one or more samples of the 20% give unsatisfactory or non-conforming results the whole batch shall be tested.



4. Machining allowance

The material to be removed by machining shall not exceed 7 mm (see figure 3) or the limits specified in Table 4.1.

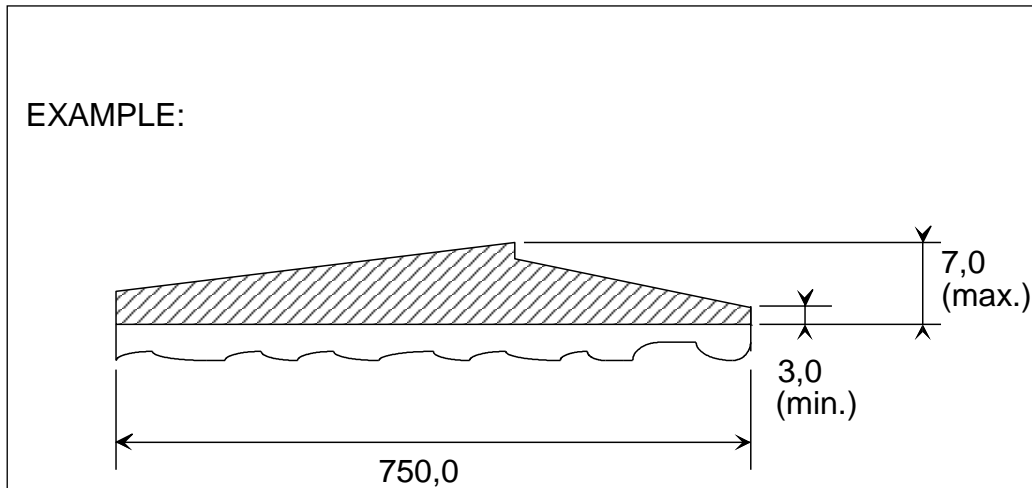


Figure 3

Maximum length or width [mm]	Minimum [mm]	Maximum ⁽¹⁾ [mm]
0 - 50	1.5	2.5
51 - 100	1.5	3.0
101 - 200	2.0	4.0
201 - 500	2.5	5.0
501 - 1.000	3.0	7.0

(1) Maximum allowance includes casting draft, mismatch, inlet gates, flash etc.



5. Quality inspection

5.1. Samples, approval and release for production

When new pattern equipment is laid down or renewed, test samples will be required by AVK. With the order for test samples AVK will enclose drawing, measuring record for casting and, if machining is to be carried out by the supplier, inspection form for machined part.

When the supplier has notified AVK that the test samples are ready, a preliminary measuring and inspection will be carried out by AVK inspection staff stationed near the supplying foundry, where possible. This inspection and measuring aims at excluding the worst and immediately measurable or visually detectable faults. Upon release of test samples by local inspection staff, the samples shall be forwarded to the AVK facility in question. Certification according to clause 5.3 has to be included.

The Quality Assurance Department at the AVK facility in question will measure and inspect the sample. Subsequently the sample will be machined (if not delivered in machined condition); coating will be carried out and then final assembly and pressure testing conducted.

The outcome of this process will be reviewed by the Quality Assurance Department and a report to the supplier will be issued in co-operation with the purchaser responsible at the AVK facility in question. Copies of the report will be sent to the supplier and in some circumstances to the Quality Assurance Department at the AVK Company. The sample may then either be released for trial batch production or it may be rejected.

If the sample is released for trial batch production, AVK will order a suitably sized batch. If the sample has been rejected, the seriousness of the fault / faults will be evaluated and if the fault is minor, the sample may be approved for trial batch production. The fault must be corrected before the next shipment. If the fault is major, a new sample will be requested from the supplier.

The trial batch will be delivered to the future production site, where the Quality Department will carry out an extended receiving inspection, i.e. all functional dimensions will be measured and the castings will be inspected visually. If any difference from the drawing or original sample is found, and the difference is essential for the finished item, the Quality Assurance Department at the AVK facility in question will review the matter and the supplier will be notified of their conclusion and where applicable, AVK local inspection staff will receive copies of this notification. If no differences are found or if the differences are not essential or crucial to the finished product, trial batch documents will be prepared and will follow the production order through the production process.

The trial batch follow-up form will follow the production order documents through the production process in the AVK facility in question until the item has been finished satisfactorily. After each operation, the AVK operator will add his comments for each individual operation on the trial batch follow-up form.

Upon completion of the production process, the comments on the trial batch documents will be reviewed by the Quality Assurance Department, who will prepare a report for the supplier. If there are no comments, the casting will be released for batch production and the supplier will



be notified; the Quality Assurance Department at the AVK Company will receive copies of this Release Notification.

After release for batch production orders can be placed and executed.

After test samples have been approved and released for production by AVK, their function, look, quality and material and the production methods applied must not be changed without the prior written consent of AVK.

The approval of any test samples by AVK shall not reduce the liability for warranty by the supplier. All cases of non-conformance with the specifications supplied by AVK shall be notified to AVK prior to any delivery with a view to obtaining a concession. Delivery, if any, shall be made separately and shall bear a note of the concession granted.

5.2 Quality inspection for batch production

The supplier must ensure that finished goods conform to AVK specifications and the previously approved sample.

Subsequent continual receiving inspection will be carried out by the AVK Quality Assurance Department and any comments on faults will be forwarded to the individual suppliers (Claim report); see also clause 7 of this Specification. Care shall be taken to ensure that descriptions are as clear and adequate as possible, supported by sketches or markings on drawings if needed. In order to prevent any misunderstandings the Casting Defect Reference Master will be used as general illustration in the claim report. In case of major differences or substantial faults, the purchaser responsible at AVK and the Logistics Department will be advised and provided with copies of the report.

Batch production quality inspection. The supplier must ensure that the finished castings comply with AVK specifications. AVK representatives may visit suppliers to check pattern equipment prior to production and to inspect castings prior to shipment. AVK will focus on this inspection activity in order to reduce rejection and complaint rates.

AVK shall be entitled to inspect the production at the facilities of the supplier, to have samples taken and to make other appropriate tests at the supplier's. The scope of sampling and the inspection time shall be agreed with the supplier.

The supplier shall, free of charge, replace, rework or repair any defective goods delivered or shall defray any expenses incurred by AVK in connection with the adjustment of any such defect goods delivered or faulty delivered subject to proper notification and agreement by the supplier.

AVK shall notify the supplier before reworking any defective goods delivered. Upon approval by the supplier such adjustment shall be made at the expense of the supplier. AVK has the right to make the decision on the best and most economical solution. In the case of defective goods delivered or faulty deliveries, the supplier shall refund to AVK the freight expenses of AVK, and upon proper notification and agreement by the supplier, the supplier shall further defray the return freight in case of a return of goods.



Leak-tightness test to be made on the raw part (without coating) with 2 bar air and the part immersed in water with the upper surface not more than 50 mm below the surface of the water for minimum 60 s. A check shall be made for bubbles breaking the surface of the water. No visually detectable leakage is allowed.

Alternatively the part shall be coated with a leak detection fluid and a check shall be made for the continuous formation of bubbles. See for reference EN 12266-2.

5.3. Inspection reports and certificates

5.3.1. Certificates of conformity

Certification that the requirements of the order (including material) have been met is to be supplied with each and every shipment (can be incorporated into advice note).

5.3.2. Material Certification

Suppliers shall submit material certification for castings or other material/components supplied to AVK. This certification shall include mechanical, physical and chemical properties of the material supplied. Furthermore the NDT results must be included.

Certification shall comply with EN 10204 - 3.1 with reference to EN 10213 and NDT reports. The non-destructive testing personnel shall be certified in accordance with EN ISO 9712 for the test methods used.

The result of the pressure test shall be included in the documentation to AVK e.g. in the 3.1 certificate or as an appendix to the certificate.

5.3.3. 100% dimension inspection record

All samples from new, corrected or refurbished patterns shall be supplied with 100% dimension inspection reports according to the measuring record. Such samples shall be p

acked separately and bear proper markings on the packing (samples, order no., etc.).

5.3.4. Quality assurance system

The supplier must have an appropriate quality assurance system, certified by an accredited body located in EU, and undergone an assessment for relevant materials used for pressure raised items.

5.4. Marking, identification and traceability

All items must be marked clearly with all information shown on the relevant piece part drawing. The lettering must be legible and have no sharp corners.



When required the casting date shall be positioned on the casting below the AVK reference no. of the supplying foundry, or according with drawing specification.

The format shall be as the following example: **13H20**

13 = 2013

H = 8th month = August

20 = date cast

Letters / numbers shall be minimum 10 mm high x 5 mm wide raised min. 1.5 mm above surface level.

When a foundry operates their own cast dating system, this may be used in preference to the above provided AVK are provided with any information required to recognize the cast date.

6. Handling, storage and packing

All castings are to be handled, stored and packed in such a way that each casting is prevented from causing damage to itself or another casting which would have a detrimental effect to its performance. Each package must bear quantity, AVK part no., description, supplier name, date and purchase order no. and drawing number incl. rev. no.

All shipments must comply to such technical requirements and other rules and instructions as are stated on the relevant order. The supplier shall be liable for any costs or damage inflicted upon AVK as a consequence of any non-observance of such rules and instructions on the part of the supplier.

All consignments shall be delivered on approved EURO pallets (1200 mm x 800 mm).

Maximum weight on each pallet shall not exceed 1000 kg. Frames must be used; max. 3 frames per pallet. The last frame shall cover the castings in such a way that further pallets can be placed directly on top of the first pallet.

Metal bands shall be secured around each pallet and frame assembly.

All pallets shall have a label affixed showing item no. and quantity.

Any necessary repacking of the castings on pallets will be invoiced by AVK to its supplier at current hourly wage rate.

If the above is not observed, the castings will be returned at supplier's cost. Furthermore, any costs incurred by AVK production will be invoiced to the supplier.



7. Rejection

In case of rejection, the supplier will receive a claim report from AVK and is required to reply immediately. The claim report will give the supplier details of the rejected items, such as position of defect(s) and type of defect according to Castings Defects Reference Master.

Procedure for handling of NCR Material:

- I. The supplier/foundry has 7 days to decide on the following options:
 - A: Accept or rejection based on the NCR report
 - B: Accept or rejection of cost for rework at the plant at AVK.
 - C: Accept or rejection based on sample of NCR Material
 - D: Return of hole batch of NCR Material for rework by the supplier
- II. AVK cannot rework or scrap NCR Material during the above-mentioned period. If this should happen by mistake or otherwise the supplier/foundry cannot be held responsible for this, and AVK cannot claim compensation.
- III. Should the supplier wish to have a sample of the NCR Material, AVK has to deliver samples in the fastest possible way. The supplier then has 7 days to accept or reject after receiving the NCR Material.
- IV. If the supplier does not respond within the above-mentioned time frame, AVK can scrap or rework the material and still claim compensation.

Each supplier will receive monthly rejection reports when necessary specifying number of castings rejected for specific items; specification of defects (Castings Defects Reference Master No. NX).

These reports will be the basis of financial settlements with the supplier. The supplier may request that rejected castings be returned to him (at his cost) or may visit AVK to verify rejections. The Castings Defects Reference Master will be a key instrument in the communication with the supplier.

The pictures illustrate the most frequent faults and defects, found by AVK production worldwide. Therefore, the illustrations and numbers constitute the reference material everyone in the AVK Group shall refer to in their claim reports and monthly reports to the suppliers.



8. Purchase specification for new / replacement patterns

8.1. Ownership in pattern

AVK shall enjoy full ownership and title in all patterns purchased and shall have the right to withdraw the pattern from the possession of the supplier at any time.

8.2. Maintenance

The supplier shall be responsible for all maintenance of patterns. Routine maintenance of the pattern is to be provided free of charge by the supplier assuming the pattern remains in the uninterrupted possession of the supplier.

The supplier shall guarantee that the complete pattern, including any loose items, will produce components in accordance with drawings specified on the pattern order.

8.3. Life of pattern

All patterns shall have a guaranteed life as agreed between the supplier and AVK and as detailed on the order. This is the expected life before AVK would be liable for any cost associated with major repair or refurbishment, assuming the pattern remains in the uninterrupted possession of the supplier.

8.4 Identification

Patterns are to be permanently marked "Property of AVK" and are to include the part numbers of components produced by the pattern together with supplier's serial number.

The supplier is to maintain full records of quantities produced from the pattern and any maintenance carried out on the pattern. Each pattern must have a number and if there are more than one pattern of the same item in the molding equipment, the patterns must bear consecutive numbering (e.g. 1-2-3-4).

8.5 Specification

All components supplied from the pattern shall be in full accordance with the specification requirements. Application for concessions shall be made in writing to the AVK ordering company.



9. Responsibility and liability

When orders are placed for pattern equipment, the supplier shall take full responsibility for the design and manufacture of the pattern. However, AVK shall be consulted on the pattern design as the assembly and performance of the finished product may be affected. The position of ejector pin marks, the avoidance of split lines in critical areas and porosity are of paramount importance.

The supplier shall take full responsibility for the selection of size and output rate of the manufacturing process to meet AVK production requirements. AVK shall supply all necessary technical documentation and is responsible for the design and construction and retains the ownership of the Intellectual Property Rights in the equipment, designs, specifications etc.

10. Confidentiality

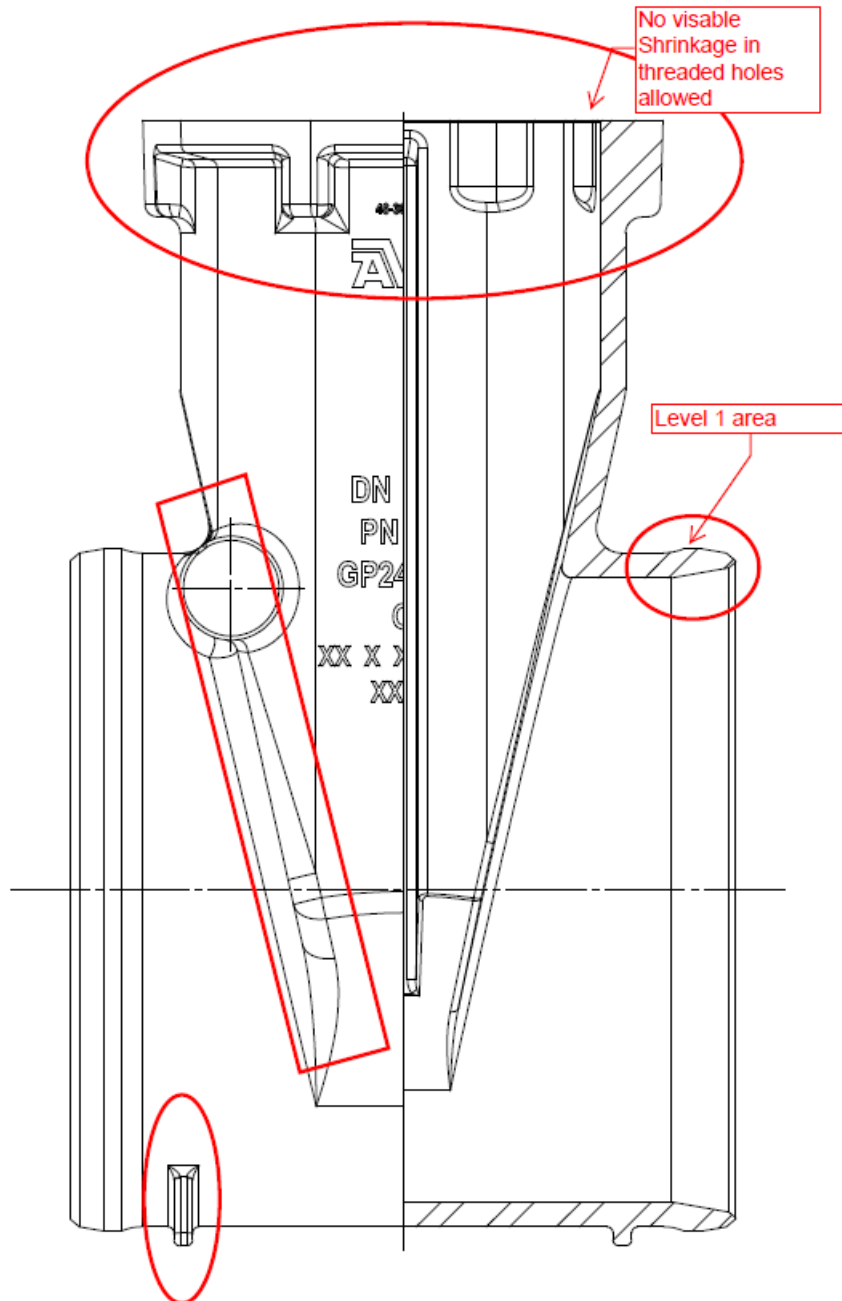
All aspects of the design of the product and production methods disclosed by AVK are strictly confidential and AVK's competitive position shall be protected at all times. The supplier shall ensure that any subcontract suppliers maintain this confidentiality. They must not be disclosed to or used by any person within the organization of the supplier other than such persons as are involved in the production of goods for delivery to AVK. Without the consent of AVK in writing, the supplier must not advertise or in any other way make public that he is supplying castings to, or has entered into any agreement for the supply of castings to AVK. The supplier does not have any rights to dispose of the pattern, transfer the pattern to another supplier or permit the pattern to be used for any other purpose without AVK's express permission in writing.

Note: This is supplementary to any instructions on specific casting drawings. In event of any dubiety or contradiction between instructions on drawings and this standard, the supplying foundry shall be responsible for obtaining clarification from AVK before proceeding.



11. Enclosures

A. Shell and Weld ends - Identified areas





PS.8
Rev AE / Date 09-07-2024
KB/JBN

B. Inspection Certificate

INSPECTION CERTIFICATE DIN 50049 - 3.1 B
ABNAHMEPRÜFZEUGNIS
CERTIFICAT DE RECEPTION

No.:

SUPPLIER:
LIEFERANT:
FOURNISSEUR:

ORDER NO.:
BESTELLUNG NR.:
COMMANDE NO.:

PURCHASER:
BESTELLER:
COMMETTANT:

ORDER NO.:
BESTELLUNG NR.:
COMMANDE NO.:

PRODUCT:
ERZEUGNIS FORM:
PRODUIT:

MATERIAL:
WERKSTOFF:
MATERIAUX:

ITEM POS. POSTE	CAST NO. SCHMELZEN NR. COULEE NO.	QTY. ANZAHL NOMBRE	DIMENSIONS ABMESSUNGEN DIMENSION		WEIGHT MASSE POIDS	MELTING FURNACE ERSCHM. ART MODE DE FUSION	CONDITION OF DELIVERY LIFERZISTAND ETAT DE LIVRAISON							
CHEMICAL COMPOSITION / CHEMISCHE ZUSAMMENSETZUNG / COMPOSITION CHIMIQUE														
ITEM POS. POSTE	CAST NO. SCHMELZEN NR. COULEE NO.	C %	Si %	Mn %	Cr %	Ni %	Mo %	P %	S %
MECHANICAL PROPERTIES / MECHANISCHE EIGENSCHAFTEN / CARACTÉRISTIQUES MÉCANIQUES														
ITEM POS. POSTE	CAST NO. SCHMELZEN NR. COULEE NO.	YIELD POINT STRECK GRENZE LIMITE ELAST. N/mm ²	TENSILE STRENGTH ZUGFESTIGKEIT RESIST. À LA TRACT. N/mm ²	ELONGATION DEHNUNG ALLONGEMENT % L _{5 D₀}	HARDNESS HÄRTE DURETÉ HB	IMPACT VALUE (DVM) KERBSCHLAGZAHIGKEIT RÉSILIENCE								
						1	2	3	AVERAGE MITTEL MOYENNE	TEMP °C				

WE HEREBY CERTIFY, THAT THE MATERIAL DESCRIBED ABOVE HAS BEEN TESTED AND COMPLIES WITH THE TERMS OF THE ORDER CONTRACT

ES WIRD BESTÄTIGT, DASS DIE LIEFERUNG GEPRÜFT WURDE UND DEN VEREINBARUNGEN BEI DER BESTELLANNAHME ENTSPRICHT

NOUS CERTIFIONS QUE LA LIVRAISON ÉTAIT VÉRIFIÉE ET EST CONFORME AUX STIPULATIONS DE L'ACCEPTATION DE LA COMMANDE

	SUPPLIER / LIEFERANT / FOURNISSEUR	WORKS INSPECTOR / WERKSSACHVERSTÄNDIGE / L'EXPERT DE L'USINE
DATE/DATUM/DATE
NAME/NAHME/NOM
SIGNATUR/UNTERSCHRIFT/SIGNATURE